

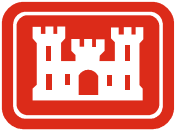


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# *Perchlorate Toxicology*

- Thyroid disruption (mimics iodide)
- Human drug tests in 1950's
- EPA Provisional Reference Dose 1992/1995  
Range of 4 to 18 ppb in drinking water
- Children's health
  - Neonatal data not conclusive (epidemiology)
- High uncertainties

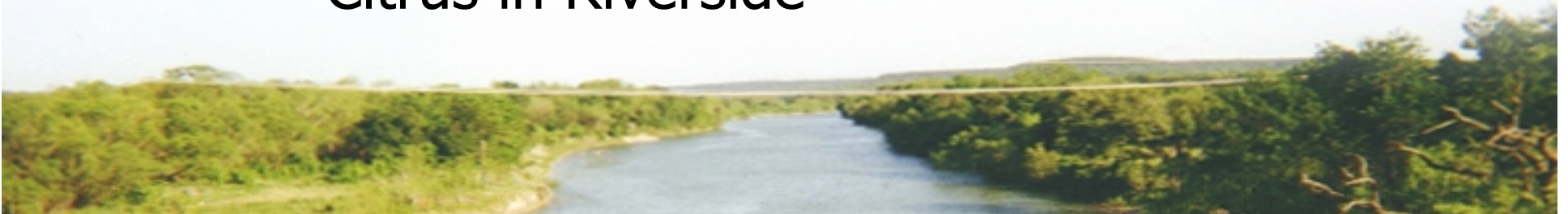




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## *Ecological Risks*

- Direct effects on fish and animals at high concentrations
- Unknown developmental effects
- Concern for arid region wetlands
- Agriculture uses – Colorado River & groundwater
  - Lettuce near Yuma
  - Imperial Valley/Coachella Valley
  - Citrus in Riverside



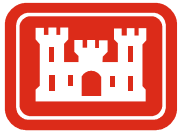


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# *Treatment Technology*

- Granulated activated charcoal (GAC) of limited use
- Effective treatments include:
  - Anoxic bioremediation
  - Ion exchange
  - Reverse osmosis



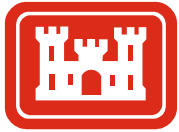


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## *Perchlorate Web Sites*

- USEPA – Interagency Perchlorate Steering Committee
  - [www.epa.gov/ogwdw/ccl/perchlor/perchlor.html](http://www.epa.gov/ogwdw/ccl/perchlor/perchlor.html)
- California Department of Health Services
  - [www.dhs.cahwnet.gov](http://www.dhs.cahwnet.gov) (search, or:)
  - [www.dhs.cahwnet.gov/ps/ddwem/chemicals/perchl/perchlindinx.htm](http://www.dhs.cahwnet.gov/ps/ddwem/chemicals/perchl/perchlindinx.htm)





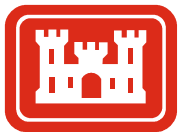
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# ***Chronology of Perchlorate Testing in the Bosque River Watershed***

- Water quality monitoring in the South Bosque River watershed indicated unexplained high levels of nitrates;
- City of Waco learned that a facility manufacturing solid fuel rockets in California had released perchlorate into the groundwater which ultimately contaminated the drinking water, irrigation, and recreation water supplies.

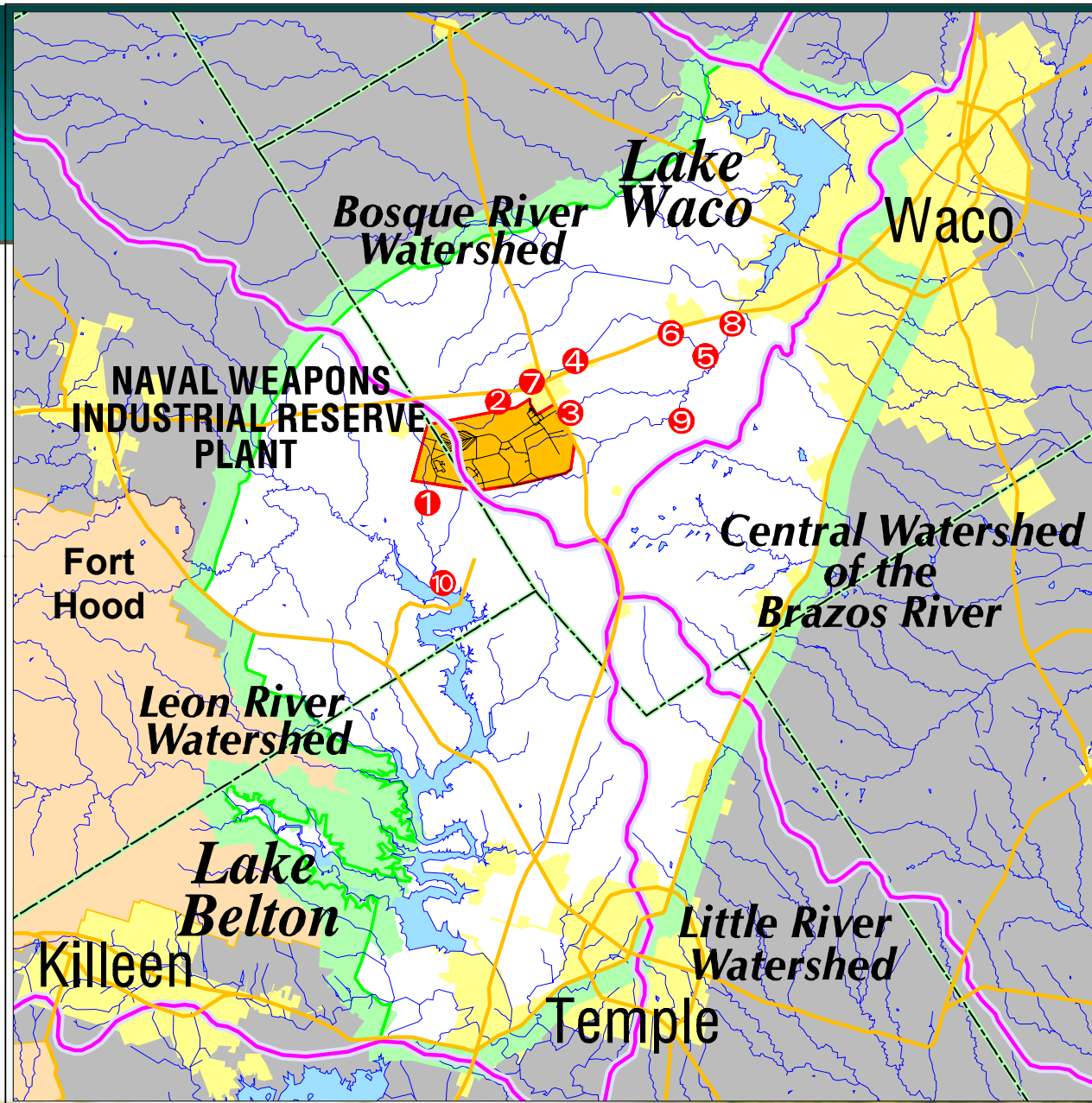






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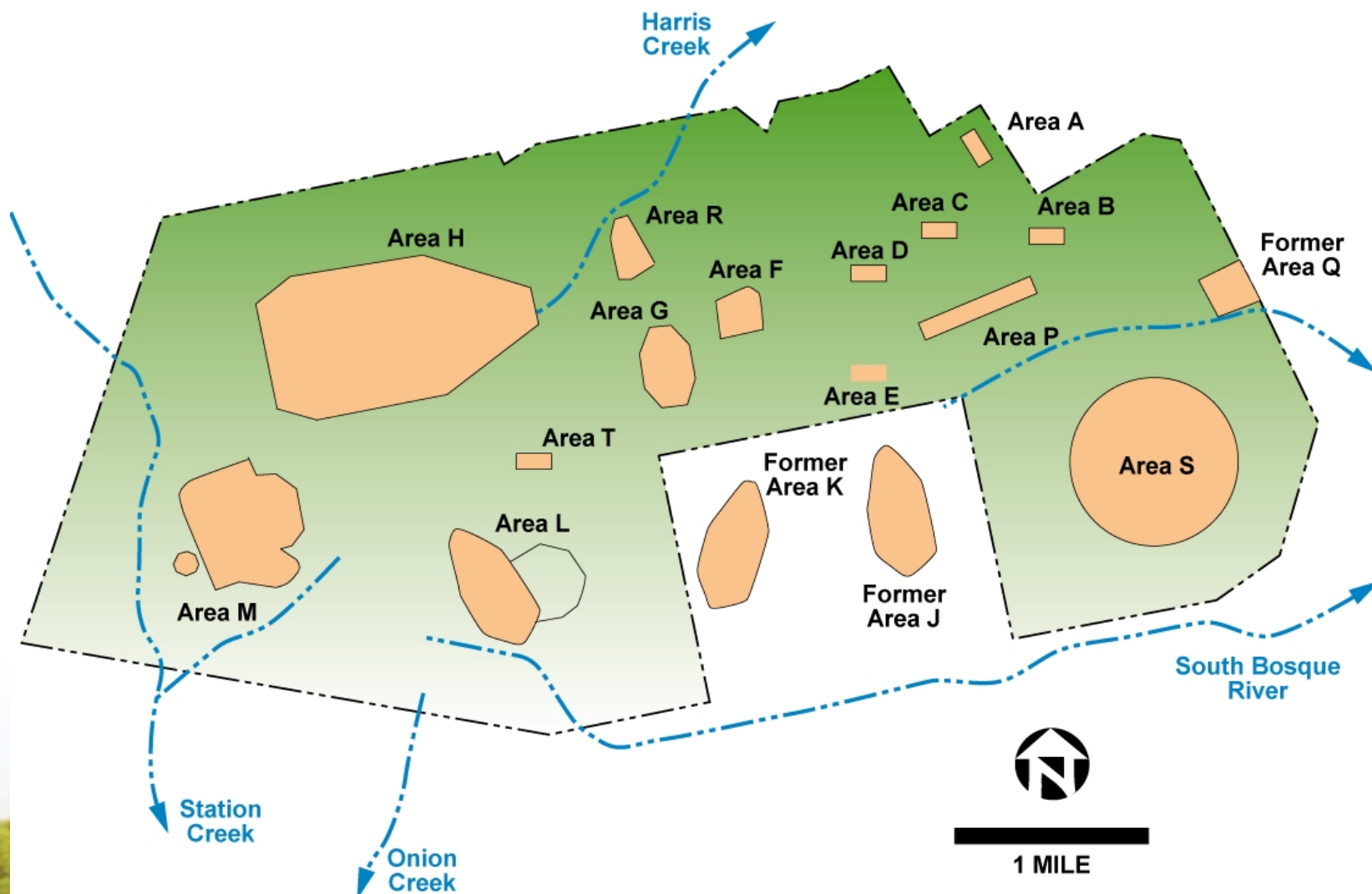
# Area Map

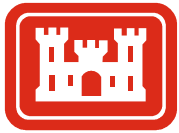




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# *General Site Map - NWIRP McGregor*





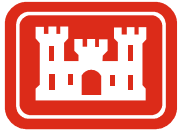
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# ***The Bosque/Leon River Watershed Stakeholders Alliance***

- **City of Belton**
- **City of Bruceville-Eddy**
- **City of Copperas Cove**
- **City of Gatesville**
- **City of Harker Heights**
- **City of Hewitt**
- **City of Killeen**
- **City of Lorena**
- **City of Moody**
- **Bluebonnett Water Supply Corporation**
- **Bell County and McLennon County Health Districts**
- **Central Texas American Water Works Association**
- **City of Morgan's Point**
- **City of Nolanville**
- **City of Robinson**
- **City of Temple**
- **City of Troy**
- **City of Waco**
- **City of Woodway**
- **Bell County WCID #1**
- **Bell County WCID #3**



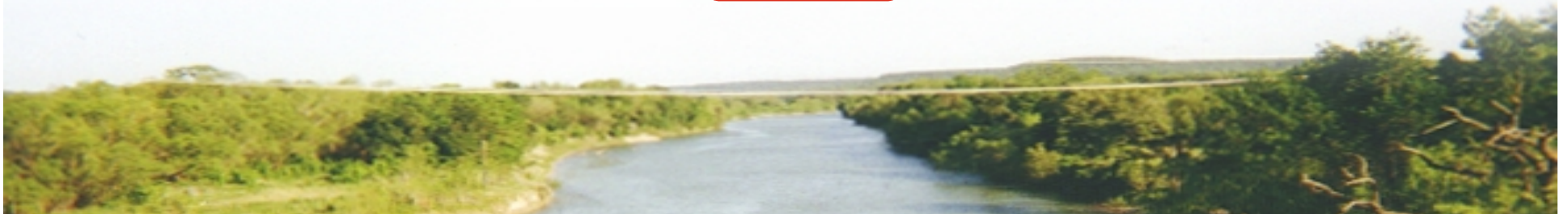
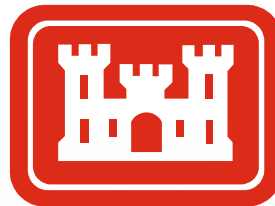




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# *Project Overview*

**Brian J. Condikey**  
**Project Manager**  
**US Army Corps of Engineers**  
**Fort Worth District**





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## *Project Team Members*

- **U.S. Army Corps of Engineers** – project management and technical support
- **Texas Natural Resource Conservation Commission (TNRCC)** - advisory to study team, liaison with Interagency Perchlorate Steering Committee
- **Brazos River Authority (BRA)** – technical services and stakeholder coordination
- **The Institute of Environmental and Human Health (TIEHH) at Texas Tech University** – toxicological and ecological studies
- **Montgomery Watson Harza** – watershed hydrological studies, fate and transport, modeling
- **U.S. Environmental Protection Agency** – advisory to study team, regulatory liaison
- **Stakeholder Consortium** – advisory to study team, community interface

